NAVAL SUBMARINE MEDICAL RESEARCH LABORATORY

Submarine Base New London,
Groton CT 06349

CAPT Garry Higgins, MSC, USN
Commanding Officer

Our Mission: To Protect the Health and Enhance the Performance of our War Fighters Through Focused Submarine, Diving and Surface Research Solutions

Staff
Facilities
Integration
Strategy
Core
Future
Contacts

Discussion Points

- Scientific and Engineering Staff Capabilities
- NSMRL Unique Physical Facilities
- Fleet Integration
- Strategic Direction
- Core Research
- Future Focus
- Points of Contact

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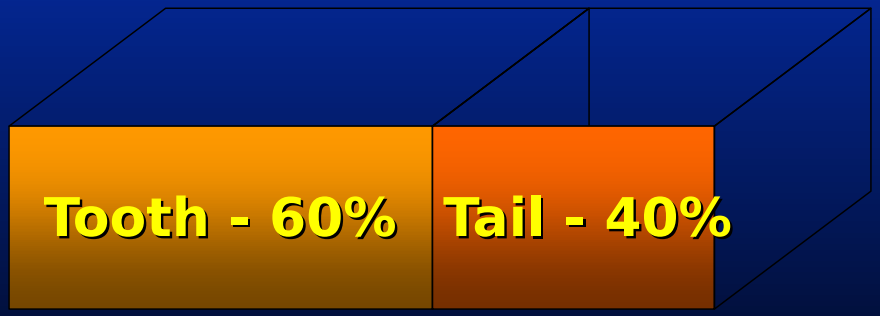
Scientific and Engineering Support Staff

- 15 Ph.D. and M.D. Senior Investigators
- 3 M.S. Investigators
- 5 Research and Engineering Support
- 5 Divers Onboard by Year End
- 19 Military and Civilian Support Staff



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NSMRL Unique Physical Facilities

- Two Hyperbaric Chambers - Saturation and Hypobaric Capability
- Anechoic and Reverberant Chambers
- Ten Sound Proof Audio Testing Booths
- Vision and Auditory Research Suites
- Technical Library & Graphics Studio
- Waterfront Access (Submarines and Diving)
- Diving Work Boat

Naval Submarine Medical Research Laboratory

- Staff
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NSMRL
INTEGRATION

ONR

NUMI

NAVSEA &
NAVY DIVING

NAVREG
N.E.

CNO-N77
SUBMARINES

NAVSUBASE
NLON / FLEET
SUBRON/DEVRON

BUMED

NATO /
FOREIGN

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Current Issues / Successes and Challenges

- Fleet Review 2003
- DISSUB03 - 1st USN Disabled Sub Exercise
- 1st National Defense Industrial Association (NDIA) Breakout Session for Sub Medicine
- Int. Programs with Singapore, Australia, Japan and Germany for Biomedical R&D
- 100% Reimbursable Funding
- Military and Civilian Staffing
- MILCON 2010

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- ***Sea Strike*** – Projecting Precise and Persistent Power
  "…Optimizing Warfighting Performance"
- ***Sea Shield*** – Projecting Global Defensive Assurance
  "…Protecting our Forces Afloat, Ashore, in Port"
- ***Sea Basing*** – Projecting Joint Operational Independence
  "…Ensuring Strike and Shield Capabilities in Joint Operations"

BUMED and Office of Naval Research

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Core Research Areas

- Healthy and Fit Force and Force Health Protection
- Casualty Prevention
  - Hyperbaric Research (NSMRL)
  - Undersea Casualties (NSMRL)
- Casualty Care and Management

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COMNAVSUBFOR's *"Cost of Doing Business"* Core Capabilities

- **Submarine Medicine and Survival Systems**
  - Disaster Survival, Escape & Rescue
  - Atmosphere Monitoring & Life Support
  - Submarine Medicine & Occupational Health
  - Submariner Psychological Assessments
- **Operational and Sensory Systems**
  - Submarine Information Processing & Display
  - Human Performance Research
- **Diving and Environmental Simulation**
  - Underwater Sound and Sonar Bioeffects

NSMRL Strategic Focus

- Optimize Health and Fitness (Fit Force)
- Minimize Casualties
- Maximize Readiness (Persistence in Combat)
- Casualty Care

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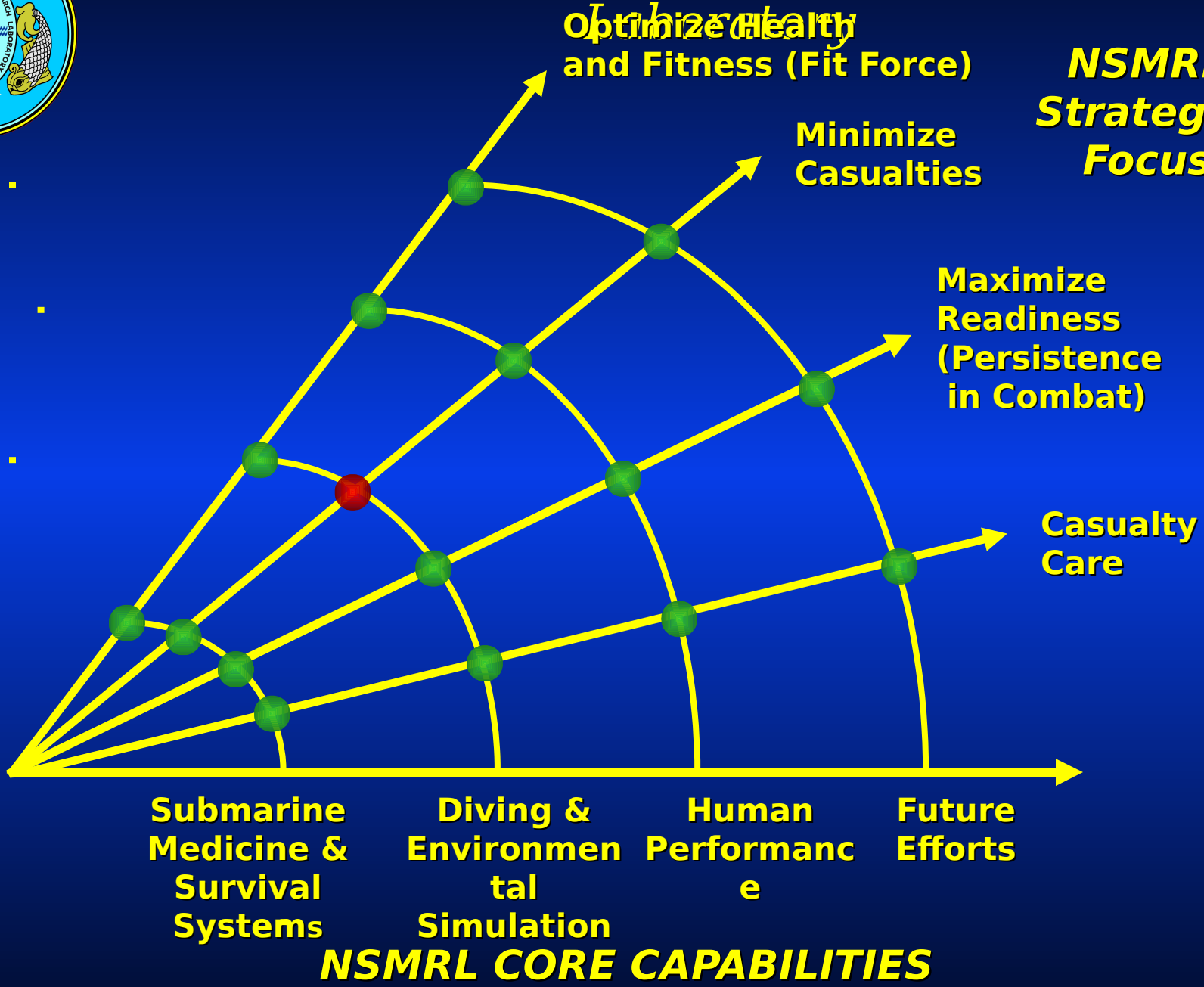
Naval Submarine Medical Research Laboratory



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Submarine Medicine and Survival Systems

- Optimize Health and Fitness (Fit Force)
  - Psychological Screening
  - Vitamin D Research
- Minimize Casualties
  - Submarine Atmosphere Monitoring
  - DISSUB Equipment and Procedures
- Maximize Readiness
  - SURVIVEX Exercises
  - Watchstanding Schedules
- Casualty Care
  - Retractable Safety Syringe Development

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Diving & Environmental Simulation

- Optimize Health and Fitness (Fit Force)
  - Sound Localization
- Minimize Casualties
  - Sonar Bioeffects
  - Dive Station Noise Surveys
  - SURTASS LFA Monitoring
- Maximize Readiness
  - Nitrogen Elimination
  - O_2 & CO_2 Effects on Auditory Sensitivity
  - Diver Deterrence
- Casualty Care

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Human Performance

- Optimize Health and Fitness (Fit Force)
  - Sea Warrior/ Task Force Excel Support
- Minimize Casualties
  - Hearing Conservation Research
- Maximize Readiness
  - Collision Avoidance
  - Situation Awareness
  - Operator Headsets/Communication
  - Tactical Team Modeling
- Casualty Care
  - Electronic Stethoscope

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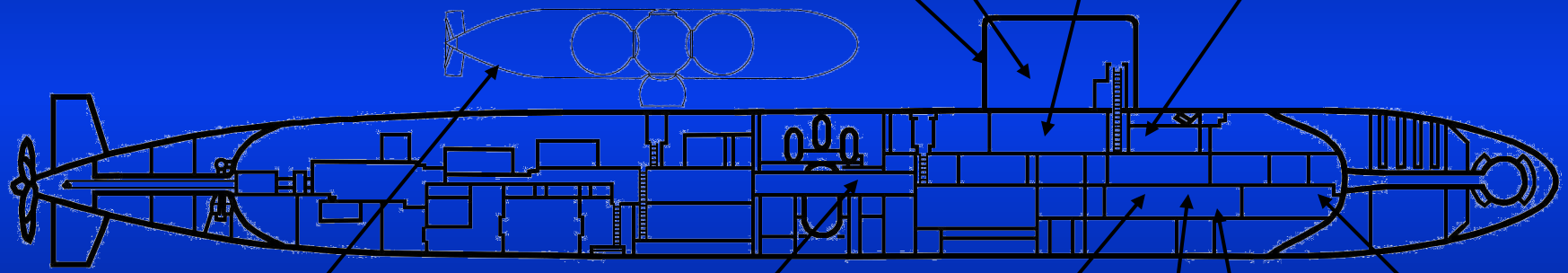
Future Efforts

- Optimize Health and Fitness (Fit Force)
  - Electronic Seasickness Prevention
- Minimize Casualties
  - Altitude/Diving Effects
  - Non-recompressive DCI Treatment
  - Advanced Crew Hearing Protection
- Maximize Readiness
  - 3-D Auditory Target Presentation
  - SSGN TTWCS Situation Awareness
  - Advanced Ear Insert Communication Device
- Casualty Care
  - Triage BioSensor
  - SSGN Casualty Care

Naval Submarine Medical Research Laboratory

Operational Effectiveness



Task Force EXCEL

Command Information & Displays, Situation Awareness, Collision Avoidanc

Watch-Standing Cycles

Sound Canceling Headphones

Diver Guidance & Protection

Environmental Monitoring (SAHAP)

Submarine Medicine

SUBSCREEN

DISSUB & SURVIVEX

Hearing Conservation

Health & Safety

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Contact Information:

CAPT Garry Higgins, Commanding Officer

LCDR Randal LeBlanc, Executive Officer

Dr. Jerry Lamb, Ph.D., Technical Director

HMCS (SS) Steven Plourd,
Senior Enlisted Advisor

860-694-3263/6 (Commercial)
694-3263/6 (DSN)
lastname@nsmrl.navy.mil (e-mail)
www.nhrc.navy.mil/nsmrl (web site)

Subsequent to your questions Sir, this concludes my brief.

Sonar Bioeffects

Dr. E. Cudahy, Ph.D.

Naval Relevance

- Underwater sound from sonar and other sources can be harmful to divers. The goal of this research is to develop guidance, measurement tools, and protective gear to enhance diver performance and safety in the presence of underwater sound.

Current Projects

- Low Frequency (500 - 2500 Hz) guidance
- Sound protection for wet suit conditions
- Impulse sound bioeffects
- Loudness Mapping for underwater sound
- Ultrasound bioeffects
- SURTASS LFA guidance, diver

Transition/Support to Fleet

- SURTASS LFA Environmental Impact Statement
- Vieques
- Safe Diving distances from underwater sound sources (sonar, blast, etc.) for all frequency ranges (N77, N45, NSSF, EOD, SOCOM, ASDS, NAVSEA, SPAWAR, PMS 395, United Kingdom, Australian Royal Navy, NATO, SUBLANT).
- Force Protection (SUBLANT, 6th Fleet)